

Response
Serial No. 09/604,072
Attorney Docket No. 000808

Amendment to the Claims:

This listing of claims replaces all prior versions and listings of claims in the application.

Listing of Claims:

Claim 1 (Previously Presented): A solid-state imaging device comprising:

a plurality of pixels, each pixel including a light-sensitive portion for photoelectrically converting incident light, a transfer gate for transferring a charge stored in said light-sensitive portion, a resettable detection capacitor for storing said charge transferred from said transfer gate, and a selection switch for outputting a charge of said detection capacitor according to a selection signal;

a charge amplifier for converting to a voltage a charge of said detection capacitor, which is outputted from the pixels; and

a correlated double sampling circuit for obtaining a voltage difference between a reset voltage and a detected voltage converted by the charge amplifier,

wherein said reset voltage is converted from a charge of the detection capacitor when being reset at reset timing, and said detected voltage is converted from a charge of the detection capacitor when a charge stored in the light-sensitive portion is transferred to the reset detection capacitor, following to the reset timing.

Claim 2 (Original): The solid-state imaging device according to claim 1, wherein said charge amplifier is a capacitive feedback-type impedance conversion circuit.

Claim 3 (Previously Presented): The solid-state imaging device according to claim 1, wherein said charge amplifier converts to the reset voltage a reset level of said detection capacitor by said selection switch transitioning to ON, and said detection capacitor being connected to an input of said charge amplifier, and thereafter, converts to the detected voltage said charge of the detection capacitor, when the charge stored in the light-sensitive portion is transferred to said detection capacitor by said transfer gate transitioning to ON.

Claim 4 (Currently Amended): A solid-state imaging device comprising:

a plurality of pixels, each pixel including a light-sensitive portion for photoelectrically converting incident light and storing a charge, a reset gate, connected to said light-sensitive portion, for depleting said light-sensitive portion by becoming conductive in response to a reset signal, and a transfer gate, connected to said light-sensitive portion, for outputting a charge, which is stored in said light-sensitive portion after being depleted, by becoming conductive in a response to a selection signal;

a charge amplifier, connected to said transfer gate of said pixel, for converting said outputted charge to a voltage; and

a corrected double sampling circuit for sampling and holding an output voltage of said charge amplifier,

wherein a differential voltage between a reset level which said charge amplifier outputs when being reset, and a detection level, which said charge amplifier outputs in accordance with the charge outputted from said pixel, is outputted from said correlated double sampling circuit.

Claim 5 (Original): The solid-state imaging device according to claim 4 wherein said light-sensitive portion is formed by a second conductive-type cathode region, which is formed at a prescribed depth inside a first conductive-type semiconductor region, and

said reset gate is a MOS-type transistor, which is formed by said cathode region, a reset gate electrode formed on said first conductive-type semiconductor region, and a second conductive-type drain region, which is formed inside said first conductive-type semiconductor region, and which has a higher concentration than said cathode region.

Claim 6 (Original): The solid-state imaging device according to claim 5, wherein said transfer gate is a MOS-type transistor, which is formed by said cathode region, a transfer gate electrode formed on said first conductive-type semiconductor region, and a second conductive-type output region, which is formed inside said first conductive-type semiconductor region, and which is connected to an input of said charge amplifier.

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Claim 7 (Previously Presented): The solid-state imaging device according to claim 5, wherein said cathode region is depleted when said light-sensitive portion is reset.

Claim 8 (Previously Presented): The solid-state imaging device according to claim 7, wherein said first conductive-type semiconductor region is a well region formed inside a second conductive-type region, and a region directly beneath said cathode region of said well region is controlled to be depleted.

Claim 9 (Original): The solid-state imaging device according to claim 4, wherein said reset gate maintains a quasi-conductive state while said light-sensitive portion stores a photoelectrically-converted charge.